ATTACHMENT 1

PROPOSED CHANGE TO APPENDIX A

TECHNICAL SPECIFICATIONS FOR QUAD CITIES STATION

UNIT 1 FACILITY OPERATING LICENSE DPR-29

Revised Pages: 3.6/4.6-5
3.6/4.6-13

G. Jet Pumps	G. Jet Pumps
1. Whenever the reactor is in the Startup/Hot Standby or Run modes, all jet pumps shall be intact, and all operating jet pumps shall be operable. If it is determined that a jet pump is inoperable, an orderly shutdown shall be initiated and the reactor shall be in a cold shutdown condition within 24 hours.	1. Whenever there is recirculation flow with the reactor in the Startup/Hot Standby or Run modes, jet pump integrity and operability shall be checked daily by verifying that the following two conditions do not occur simultaneously: a. The recirculation pump flow differs by more than 10% from the established speed-flow characteristics. b. The indicated total core flow is more than 10% greater than the core flow value derived from established core plate DP-core flow relationships.
2. Flow indication from 19 of the 20 jet pumps shall be verified prior to initiation of reactor startup from a cold shutdown condition.	2. Additionally, when operating with one recirculation pump with the equalizer valves closed, the diffuser to lower plenum differential pressure shall be checked daily, and the differential pressure of any jet pump in the idle loop shall not vary by more than 10% from established patterns.
3. The indicated core flow is the sum of the flow indication from 19 jet pumps plus the flow from Jet Pump number 8 added in a second time to compensate for loss of flow indication from Jet Pump number 7. If flow indication failure occurs for three or more jet pumps, immediate corrective action to restore indication shall be taken. If flow indication for all but two jet pumps cannot be restored within 12 hours, an orderly shutdown shall be initiated and the reactor shall be in a cold shutdown condition within an additional 24 hours.	3. The baseline data required to evaluate the conditions in Specifications 4.6.G.1 and 4.6.G.2 will be acquired each operating cycle.
H. Recirculation Pump Flow Limitations	H. Recirculation Pump Flow Limitations
1. Whenever both recirculation pumps are in operation, pump speeds shall be maintained within 10% of each other when power level is greater than 80% and within 15% of each other when power level is less than 80%.	Recirculation pumps speed shall be checked daily for mismatch.
2. If Specification 3.6.H.1 cannot be met, one recirculation pump shall be tripped.	

G. Jet Pumps

Failure of a jet pump nozzle assembly holddown mechanism, nozzle assembly, and/or riser increases the cross-sectional flow area for blowdown following the postulated design-basis double-ended recirculation line break. Therefore, if a failure occurs, repairs must be made to assure the validity of the calculated consequences.

The following factors form the basis for the surveillance requirements:

1. A break in a jet pump decreases the flow resistance characteristic of the external piping loop causing the recirculation pump to operate at a higher flow condition when compared to previous operation.

2. The change in flow rate of the failed jet pump produces a change in the indicated flow rate of that pump relative to the other pumps in that loop. Comparison of the data with a normal relationship or pattern provides the indication necessary to detect a failed jet pump.

3. The jet pump flow deviation pattern derived from the diffuser to lower plenum differential pressure readings will be used to further evaluate jet pump operability in the event that the jet pumps fail the tests in Sections 4.6.G.1 and 2.

Agreement of indicated core flow with established core plate DP-core flow relationships provides the most assurance that recirculation flow is not bypassing the core through inactive or broken jet pumps. This bypass flow is reverse with respect to normal jet pump flow. The indicated total core flow is a summation of the flow indications for the 19 jet pumps plus the flow from Jet Pump number 8 added in a second time to compensate for loss of flow indication from Jet Pump number 7. The total core flow measuring instrumentation sums reverse jet pump flow as though it were forward flow. Thus, the indicated flow is higher than actual core flow by at least twice the normal flow through any backflowing pump. Reactivity inventory is known to a high degree of confidence so that even if a jet pump failure occurred during a shutdown period, subsequent power ascension would promptly demonstrate abnormal control rod withdrawal for any power-flow operating map point.

A nozzle-riser system failure could also generate the coincident failure of a jet pump body; however, the converse is not true. The lack of any substantial stress in the jet pump body makes failure impossible without an initial nozzle riser system failure.

H. Recirculation Pump Flow Limitations

The LPCI loop selection logic is described in the SAR, Section 6.2.4.2.5. For some limited low probability accidents with the recirculation loop operating with large speed differences, it is possible for the logic to select the wrong loop for injection. For these limited conditions, the core spray itself is adequate to prevent fuel temperatures from exceeding allowable limits. However, to limit the probability even further, a procedural limitation has been placed on the allowable variation in speed between the recirculation pumps.

The licensee's analyses indicate that above 80% power the loop select logic could not be expected to function at a speed differential of 15%. Below 80% power, the loop select logic would not be expected to function at a speed differential of 20%. This specification provides a margin of 5% in pump speed differential before a problem could arise. If the reactor is operating on one pump, the loop select logic trips that pump before making the loop selection.

Analyses have been performed which support indefinite single loop operation provided the appropriate restrictions are implemented within 12 hours. The MCPR Safety Limit has been increased by 0.01 to account for core flow and TIP reading uncertainties which are used in the statistical analysis of the safety limit. The MCPR Operating Limit has also been increased by 0.01 to maintain the same margin to the safety limit as during Dual Loop operation.

The flow biased scram and rod block setpoints are reduced to account for uncertainties associated with backflow through the idle jet pumps when the operating recirculation pump is above 20-40% of rated speed. This assures that the flow biased trips and blocks occur at conservative neutron flux levels for a given core flow.

The closure of the suction valve in the idle loop prevents the loss of LPCI flow through the idle recirculation pump into the downcomer.

ATTACHMENT 2

SUMMARY OF CHANGES

Three (3) changes to the Quad Cities Station Unit 1 Technical Specifications have been identified and are listed below as follows:

1) Page 3.6/4.6-5 -

(a) Item G.2., Limiting Conditions for Operation;

Replace "each" with "19"

(b) Item G.3., Limiting Conditions for Operation;

Delete Item G.3., LCO in its entirety and replace with "The indicated core flow is the sum of the flow indication from 19 jet pumps plus the flow... If flow indication for all but two jet pumps cannot be restored within 12 hours...within an addition 24 hours."

2 Page 3.6/4.6-13 -

(a) Item G, Jet Pumps;

Replace "20 individual jet pumps" with "19 jet pumps plus the flow from Jet Pump number 8 added in a second time to compensate for loss of flow indication from Jet Pump number 7."

ATTACHMENT 3

SAFETY EVALUATION

The proposed Technical Specification Amendments, (1) change from 20 to 19 number of jet pumps from which flow indication shall be verified prior to Reactor startups from cold conditions on Unit 1, (2) change from 20 to 19 the number of jet pumps used as input to the indicated core flow on Unit 1, and (3) change the basis to reflect (1) and (2). Subsequent additional flow indication failures will now require immediate corrective action after three instead of two flow indication failures to take into account the existing Jet Pump number 7 loss of flow indication. If the number of flow indication failures cannot be reduced to two (Jet Pump number 7 and one additional loss of flow indication) within 12 hours, then the Reactor shall be in a cold shutdown condition within an additional 24 hours. This maintains the required action levels consistent with the current number of operable jet pump flow instrument lines.

The proposed Technical Specification change does not represent a significant change in acceptance criteria or safety margins. This change is being initiated as a result of considerations that continuing Unit One operation without flow indication from all 20 jet pumps is not within strict compliance of current Technical Specifications.

Unit 1 has been operated with one failed jet pump instrument since November 17, 1972, when the Jet Pump number 7 DP instrument line failed. Operation in this manner has been satisfactory and both the ability to accurately monitor total core flow and to demonstrate jet pump integrity has been adequately maintained.

Operation in this fashion has not been detrimental to the core measurement system accuracy. The sensing line on Jet Pump number 7 is inoperable but the jet pump itself is completely operable. Jet Pump number 7 receives drive flow from the same riser as Jet Pump number 8. Thus, the two jet pumps should have equivalent flows. Base data taken prior to the sensing line failure shows the ratio of Jet Pump number 7 to number 8 flows to be 1.0057. This demonstrates that the pumps have flows that are equal within the accuracy of the instrumentation. The milliamp flow signal of Jet Pump number 8 has been supplied to the core flow summer to represent Jet Pump number 7 flow, giving a total core flow based on 20 inputs. It is possible to employ this same method of supplying substitute jet pump flow signals to the core flow summer to have a valid indication of total core flow even in the event of multiple jet pump flow sensing line failures. Hence, the proposed changes to the Technical Specifications are conservative with regards to the impact on the core flow measurement system.

In addition to the surveillance on individual jet pump flows, there are a variety of acceptable means for verifying jet pump integrity. The methods available include the following comparisons:

1. Recirculation pump speed to recirculation loop flow (Technical Specification requirement).

2. Core flow to core plate DP (Technical Specification requirement).

3. Core flow to recirculation drive flow.

4. Recirculation pump speed to jet pump loop flow.

The ability of these methods to detect jet pump failure has not been jeopardized by the loss of Jet Pump number 7 flow indication since the capability of the core measurement system has been maintained. The proposed Technical Specification neither alters the jet pump integrity surveillance methods used nor their ability to detect jet pump failure.

The Jet Pump number 7 instrument line provides an additional leakage path from the jet pump to the annulus region. The instrument line is a 0.25 inch line and would allow insignificant leakage during the design basis LOCA compared to the capacity of the available core cooling systems. The leakage from the sensing line is also insignificant with respect to the design leakage assumed for jet pumps during normal operations and during LPCI operation. Jet pump flow indication line failures have been observed at other GE plant locations and GE has not identified any need to address the effect on LOCA analysis when considering operation with loss of a jet pump flow sensing line.

From the above discussion, it is concluded that continued operation of Quad-Cities Unit 1 with loss of Jet Pump number 7 flow indication is acceptable under the provisions of the proposed change to the Technical Specifications. Core measurement system accuracy is unchanged, the ability to determine jet pump integrity and operability has not been affected, and operation of the plant with a failed jet pump sensing line poses no threat to the health and safety of the public.

ATTACHMENT 4

EVALUATION OF SIGNIFICANT HAZARDS CONSIDERATION

JET PUMP INSTRUMENTATION

TECH SPECS 3.6/4.6-5 AND 3.6/4.6-13

DESCRIPTION OF AMENDMENT REQUEST

Commonwealth Edison Company proposes to amend Operating License DPR-29 to change the number of jet pumps required to have flow indication prior to Reactor startup, and the number of jet pumps used as input to the indicated core flow.

The proposed Technical Specification change does not represent a significant change in acceptance criteria or safety margins. This change is being initiated as a result of considerations that continuing Unit One operation without flow indication from all 20 jet pumps is not within strict compliance of current Technical Specifications.

In addressing Reactor operation with a failed jet pump instrument line, three items of concern are identified. These are the core flow measurement system accuracy, jet pump integrity surveillance capability, and the affect on LOCA analysis.

Quad-Cities Unit 1 has operated since October 17, 1972, with the DP instrumentation on Jet Pump number 7 inoperable. Based on data taken prior to the instrument line failure of Jet Pump number 7, the jet pump flows of number 7 and number 8 are equal within the accuracy of the instrumentation. During this time period, core flow measurement system accuracy has been maintained by supplying the flow signal of Jet Pump number 8 into the core flow summer to represent Jet Pump number 7 flow giving a total core flow based on 20 inputs. Core flow calculated by this method is within the accuracy achieved by summing the inputs from all 20 jet pumps provided Jet Pump number 7 and number 8 are operating normally.

There are a number of acceptable methods for verifying jet pump integrity during operation in addition to the surveillance on individual jet pump flows. These include the following comparisons:

1. Recirculation pump speed to recirculation loop flow (Technical Specification requirement).

2. Core flow to core plate DP (Technical Specification requirement).

3. Core flow to recirculation drive flow.

4. Recirculation pump speed to jet pump loop flow.

In considering the effect on LOCA analysis, the broken instrument line provides an additional leakage path from the jet pump to the annulus region. The instrument line is a 0.25 inch line and leakage through this line during the design basis LOCA is insignificant when compared to the available core cooling capacity and design leakage attributed to jet pumps under normal and LOCA conditions. LOCA sensitivity studies have indicated that an increase in leakage on the order of that associated with a failed jet pump instrument line has no effect on LOCA safety limits or their calculations.

BASIS FOR NO SIGNIFICANT HAZARD DETERMINATION

Commonwealth Edison Company has evaluated this proposed amendment and determined that it involves no significant hazards considerations. In accordance with the criteria of 10 CFR 50.92(c), a proposed amendment to an operating license involves no significant hazards consideration if operation of the facility in accordance with the proposed amendment would not:

1) Involve a significant increase in the probability or consequences of an accident previously evaluated because;

   (a) a LOCA is the only previously evaluated accident which is involved with the broken instrument line. Of the two concerns, jet pump integrity, and additional leakage path, Jet Pump Integrity is monitored through the surveillance on individual jet pump flows and four additional comparisons to verify integrity during operation. The additional leakage path through the broken instrument line during a design basis LOCA is insignificant when compared to the available core cooling capacity and leakage attributed to jet pump under expected LOCA conditions. Therefore, the proposed changes do not increase the probability or consequences of previously evaluated accidents.

2) Create the possibility of a new or different kind of accident from any accident previously evaluated; because;

(a) a review of the effect of the broken instrument line does not reveal a new or different kind of accident from any previously evaluated. The broken line does not expose the inside of the line to any different environment then that to which any other instrument line is exposed. As a result, the change does not create the possibility of a new or different kind of accident than previously was evaluated.

3) Involve a significant reduction in the margin of safety, because;

(a) the loss of Jet Pump number 7 has been compensated for by the use of the signal from Jet Pump number 8 which is equal, within the accuracy of the instrument to Jet Pump number 7, This provides for a total core flow measurement which is accurate. Jet Pump integrity for Jet Pump number 7 is verified by using Jet Pump number 8 which share the same drive flow riser and nozzle assembly. The individual jet pump flow surveillance for Jet Pump number 8 provides for continued monitoring of Jet Pump number 7 assuring that there is adequate flow monitoring and measurement. Hence the change does not result in a decrease in the margin of safety.

Therefore since the proposed license amendment satisfies the criteria specified in 10 CFR 50.92, Commonwealth Edison has determined that a no significant hazards consideration exists for this license amendment. We request its approval in accordance with the provisions of 10 CFR 50.91(a)(4).

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